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Key Success Factors of Quality Management System in Uzbek Automotive Companies

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ABSTRACT. The article presents the key success factors for easy design, fast implement and effectively develop ISO 9000 – based Quality Management System (QMS), which can help using QMS according to the 9000 standard most successfully.

The investigation has shown that well-developed development strategy is very important because strategic orientation is a moderating factor influencing on the efficiency QMS.

Findings of the investigation also show that strong internal motivation to improve a company's quality needs to establish a high efficiency quality management system that leads to internal and external benefits. Successful ISO 9000 – based Quality Management System depends on all critical factors as key success factors as the quality-focused strategy of management, the continuous improvement of processes, people and system (innovation activity), the motivation and reward system, the paradigm changes in personnel management (empowerment, education and training), the measurement of performance and improving communication.

KEYWORDS: Quality management, Socio-technical system, QMS - Quality Management System, ISO 9000 standards, Personnel development, Strategy, Company inner culture.

I. INTRODUCTION

The International Standards based on ISO 9000 has been developed to organize quality improvement activity of any organization regardless of size, type and industrial activity (ISO 9001:2015). The certification on requirements of ISO 9000 – based QMS benefits all participants: goods-makers (manufacturers), service providers, users, consumers and society regulators as well as supports sustainable development. QMS certificated according to ISO international standards gives confidence and facilitates access to world markets and its popularity continues today.

Results of the ISO Survey (2018) shows 'up to the end of December 2018, at least 1 million ISO 9001 certificates had been issued in 170 countries and economies' and 2018 total represents an increase by 3% over 2017.[23]

To improve competitiveness around the world, ISO 9000 has been widely adopted as a quality management system, but with mixed success [20],[22].

Despite the numerical success of ISO-based QMS, the certification QMS on ISO 9000 is much criticized for low effectiveness, because successful certification on requirements of the ISO 9000 is not guarantee for improved performance after its implementation [11]. More than, some studies have confirmed that ISO 9000 certification is too expensive, too time-consuming, resource-consuming, too formalized and impersonal, and that sometimes costs are greater than the benefits derived [20]

The QMS based on standards ISO 9001 (quality) have gained recognition in Uzbekistan. The Uzbek companies and organizations of all kinds have been rapidly changing over recent 20 years. Organizations and companies are becoming increasingly dependent on each other and foreign partners on business. To be effective and relevant now means the new standards and standardization based on the changing expectations of industry, social and professional authorities, partners and all stakeholders.

There is an essential necessity for the usage of the well-known international standards ISO, so the management systems have to be carefully positioned according to international standards and guidelines. In these conditions, the



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quality management systems based on international standards are a part of the process of moving forward and international standards ISO plays a role in determining corporate performance and license to operate.

The implementation and sustainable development of a quality management system and its step-by-step and subsequent certification is a voluntary process supported by the organization's own strategy, motivations, policies and goals. [1]

To have more benefits from establishing Quality Management System based on International Standards ISO 9000 and their sustainable development, companies may take into consideration that the design, implementation and development of an organization's quality management system is influenced by the organization's strategy, its size and structure, organizational inner and outside environments and its changes.[11],[12].

In this connection it can be stated that although ISO 9000 standard is widely adopted in different industries and sectors, ISO certified organizations can implement the standard in very different ways [23]. It means that some factors - vision and strategy of company, motivation and continuous improvement could have a crucial influence on the strategy of the implementation and development of ISO 9000-based corporate QMS.

The aims of this article is to identify the key success factors for design, establishing, certification and sustainable development QMS based on ISO 9000 standards which can help successfully implement and effective maintaining Quality management systems in automotive companies.

A. Methodology of the research.

The study problems of the QMS development for ones more efficiency was provided in "Uz Auto Motors" Stock Company(SC)/ before "Uz-DAEWOO Auto Co"/"General Motors Uzbekistan" SC in 2014-2019 years. Study includes both as participating in works and direct watching on production lines so multi-faced surveys with personal in charge for quality (operators, quality engineers, quality management team members, front-line managers, senior and top managers) of "Uz Auto Motors Co" and its suppliers. More than 22 companies - 8 large joint ventures (car producers and 7 suppliers of first ties) and more than 14 auto parts manufacturers - small and middle companies were studied.

Geographically were studied companies located in Andijan, Ferghana and Namangan province of Uzbekistan. Based on experience of collaboration and close relations and shortest distance between companies (max 70 km) all of companies may be seen as one automobile production cluster.

Analysis results on "Uz Auto Motors Co" company' QMS certification and development ones in 2010 – 2018 yy., experience of certification and development of QMS of the 7 large first ties Suppliers in 2014-2018 yy. and results of the wide-scale various 8 surveys in 14 production sites and some professionals in scientific-research institute and universities became base of the this article.

Duration these research works 236 people from 19 companies in Andijan (1- car maker, 7 large parts suppliers and others middle and small size parts suppliers), 8 people from 1 parts- supplier in Namangan, 34 people from 2 companies in Fergana, plus 5 senior researchers and 34 junior researchers from Andijan, Ferghana and Namangan local Technical universities, a total 317 professionals participated in the research. Some of them participated several (more than once) times. Main forms of collecting data are focused formal and informal face-to face interview (mainly - top managers), collective and individual focused interview and mail and on-line survey (QMS team members, Quality and Production departments managers, Quality circles members), through mailing questioners to relevant company departments.

It has seen 71% of surveyed employees (197 people) graduated Institutes, 29% of them (81) have got college graduates. According to the position, 15% of surveyed employees (41 people) were operators, 8% of them (22 people) office staff, 63% (164 people) engineers, including 21 engineers of QMS and 143 people quality engineers, 14% (38 people) managers and directors, 34 - junior researchers in relevant areas of researches.

They have experience of work at this position is as follows: 26 % employees (72 people) 1-2 years, 48 % (134 people) 3-5 years, 15% (41 people) 5-8 years, 11% (31 people) more than 8 years. So it shows the average performance of experience equals to 4-6years.



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**Table 1
Method of surveys on QMS development in companies**

Survey focus, method and date	Aim	Employees categories	Quantity of responds
Quality Engineering Status (Quality and Production departments), 2016 - 2018 yy.	The problems of QMS exploitation and development	Managers, Engineers, Operators	278
Product competitiveness and Quality, 2016 - 2018 yy.	Estimation QMS effectiveness degree	Dealers, Quality guarantee teams	48
Managerial and Technology innovations and QMS effectiveness, 2017 - 2018 yy.	Innovative approach in Quality Engineering development	Directors, managers, QMS engineers	69
Quality Problems on QMS team members opinion, 2016~2018 yy.	Quality management status and main problems of quality audit resulting	Managers, QMS team members, auditors	48
Product and processes quality problems (interview with the Top managers) 2016~2019 yy.	Quantity and Quality Determining of the actual problems of Quality	Top and Senior Managers	32
Company development strategy and Quality strategy, 2016~2019 yy.	Aligning the company's General and Quality development strategy	Top and Senior Managers	22
Innovation for Quality (Uz Auto Motors) 2014 - 2018 yy.	Motivation for Quality improvement (TQM)	The members of Quality Circles	82
Motivation for Quality (Uz Auto Motors) 2015 - 2018 yy.	Motivation for Quality improvement (TQM)	Engineers and technical staff	88

For processing data and correct conclusion making was used morphologic method shaping for the management of companies which there applied to Quality Management system [22] and generalized method of managerial problems study survey [22].

B. Strategy of Quality Management System development

About sixteen years ago the top managers of the "Uz-Daewoo Auto"/"General Motors Uzbekistan"/ now "Uz Auto Motors" company made-out the strategy for product and processes improvement through Quality Management System development (fig.1).

On results relevant researches, company made-out the next following concept of Product and Services improving.

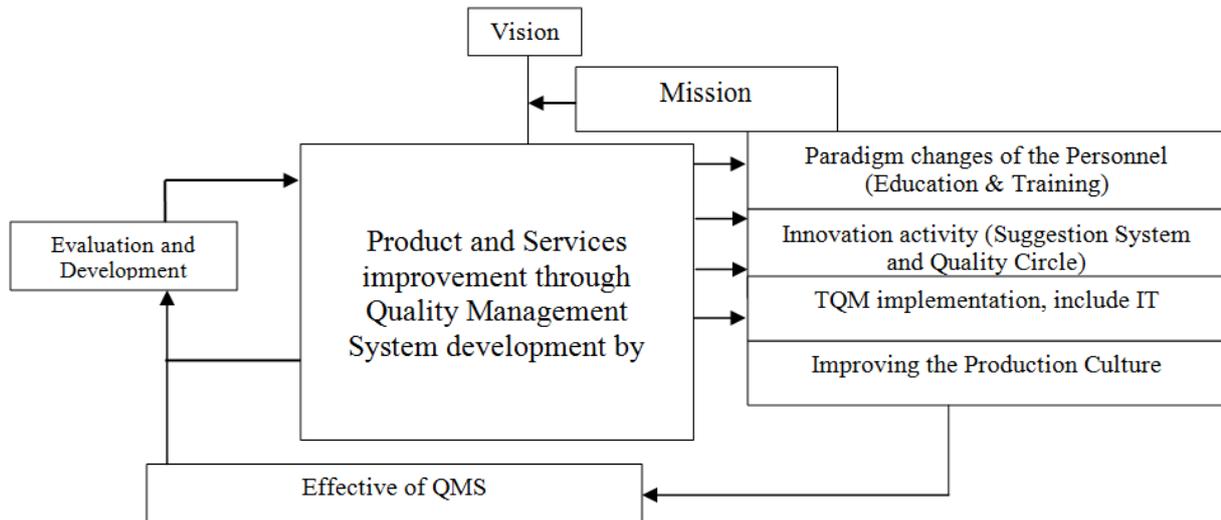


Fig.1: Concept of Company's Quality Development

Under the Vision of Company's Future, the Mission was stressed that improving of quality of the management and personnel through Strategy of quality development and Paradigm changes should be used to create the Learning organization. Strategy of quality improvement and the Paradigm changes would be as result of the Personnel Education and Training, Strong Motivation and Rewarding system.

Innovation activity includes the development of traditional Suggestion system and establishing the new personnel involvement tools as Quality Circle and TPM activity. Great innovation tools must not only increase innovations and developed innovativeness environment and culture but also used as tools for rising levels of employees and their involvement and development as specialists and employees.

As results of research determined that successful QMS development model of the company greatly depends on consciousness of the 4 important factors as:

1. Quality oriented management;
2. Personnel Paradigm changes;
3. Development of Innovation activity;
4. Development of New Corporate Culture.

All of the four factors were multi-faced and strong interdepends. The main words of the term "Quality Management System" are "Management" and "Quality". Because Management achieved by and through people (employees) and Quality achieved – by and through Technical requirements to Product or Services, it means Quality Management System is Social-Technic System and only increasing the level of management and personnel consciousness, will it be possible to achieve targets set and utilize all opportunities available to developing company.

C. Factor of the Strategy

The automobile manufacturing is industry with high competitive rate and competitive success has been discovered by achieving product highest quality [15]. Product and Services Quality is both a strategic competitive tool and a long term aims itself.

Organizations cannot afford to ignore the strategic implications of quality for their competitive position in general. Teshabaev A.E. analyzed the implementation and performance outcomes of ISO 9000 in "Uz-Daewoo Auto Co" and showed that Quality management system based on ISO 9000 is capable to generate a competitive advantage in case if top management is fully support and committed to the program implementation from a strategic perspectives [22][23]. Therefore, the most important factor is the way the sustainable developing of QMS is perceived by top management, as



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the most influential factor for quality systems development.

If certification QMS on ISO standards is not self-aimed as image improvement action, if the standard is perceived positively, top management will provide full support to ISO 9000 certification. This is evidenced through the fact that top management acts as a driver of the all multi-faced activity for company quality improvement, include of quality management systems through the provision of necessary resources as well as a key to continuous improvement through the creation of values, goals and systems to improve organization performance [9],[23].

In order to achieve the true value associated with Quality management exploitation and development, it should be made consistent with an organization's strategic directions. The identified barriers to development QMS should be eliminated in order to increase the effectiveness QMS [8].

This, in turn, will result in the expected outcome. What is more, in enhancing the level of the true value of the effective ISO 9000 – based QMS exploitation, studies on the true meaning of the standard' requirements and the new changes impacts organizations is strongly recommended [17].

Our studies showed independence the relationship between the values and requirements that underpin the ISO 9000 standard and organizational dimensions. Strategic orientation for achieving high quality of the product and processes is the most important factor for developing QMS developing choices of organizations [16].

This factor is the main for quality management in Uzbek manufacturing companies because they are high centralized and control-oriented organizations. They characterized by:

1. extensive departmentalization;
2. high formalization;
3. mainly downward communication;
4. the usage of process- oriented strategies [22].

Their operational excellence is mainly based by a highly disciplined personnel and high structured way of doing processes.

QMS based on the ISO 9000 standard, through all processes and procedures documented exactly, is preferable for developing control-oriented strategies of organizations [10].

The control of management systems by documentation (standards), formalization (operation and control standards, manuals, procedures, instructions, protocols, etc.) and systematization (hierarchical, sequentially interacting processes) in Uzbek vehicles manufacturing companies get benefits from ISO 9000 certification very easily.

As opposite of them mentioned the modern creativity-oriented organizations, characterized by:

1. low formalization,
2. cross-hierarchical, flexible and functional teams,
3. lateral, upward and downward communication system,
4. highly flexible structures and practices [22].

The normative values of systematization and documentation embodied in the ISO 9000 standard militate the options for structural fluidity' creativity and innovation (ISO 9001:2015). Therefore, modern organizations of this type face certain difficulties in implementing quality management systems according to the ISO 9001 standard.

Analyze management strategy, organizational structures, personnel development practice and the values of ISO 9000 standard shown that the more mechanistic and explicit knowledge-based organizations would easily ISO certification and QMS development, while the more organic and tacit knowledge-based organizations would experience tensions arising from the lack of fit [13].

Conceptually, in general it means differences companies, activities and processes oriented for quality by:

1. mechanistic and routine knowledge-based quality activity,

- creativity-oriented quality strategies on the base of in-built quality control operations and operation-based strategies.

Although some researchers classify organizations through their approach to strategic orientation, on our research can formulate one quality strategy for organization – flexible on the top level of management, processes and activity and more mechanistic on the activity of the front-line managers [19].

The latest version of ISO 9000 indicates that the standard is constituted by more general eight principles (ISO 9001: 2015). Thus, it is possible that some companies paying extra attention to some principles that are in the line with their corporate strategies’ [11]. Therefore, the top managers of organizations should carefully design the general Quality strategy, and especially ISO 9000-based QMS development strategy. With a well- developed ISO 9000-baesd QMS development strategy, the implementation of the standard ‘requirements can be better aligned with the environment of an organization so as to accomplish competitive advantages and better performance.

D. Factor of Motivation

Quality Management System based on ISO 9001 standards benefits both external and internal. The external benefits regarded the company and related to improvements in terms of Product promotional aspects, increase in customer satisfaction and the improvement of market share.

Some company managers (39%) state that without ISO 9000-based QMS they would not be able to sign a significant number of contracts, especially international ones [14]. Most of company managers (61%) according to the results of their works, concluded that high quality pressure is also one of the main motivations to achieve high effective QMS by companies.

The Internal benefits are related to organizational improvements, the motivation and rewarding system, continuous improvement and the measurement of performance and communication [22].

Most influential factors for quality of working and therefore quality of product are rewarding and motivational system especially for engineers. In the next Tabl.2, we can see how engineers (Quality and Product Engineering departments) think about the rewarding and motivational system.

Table 2.

Performance / answers	Strongly disagree	Disagree	Middle	Agree	Strongly agree	Mean
Current rewarding system is enough for engineering jobs	2 (1.3)	8 (5.5)	11 (7.6)	79 (54.8)	44 (30.6)	4.07
Connection to job demands must be busting according to results	6 (4.2)	21 (14.6)	55 (38.2)	21 (14.6)	14 (9.7)	3.30
Connecting to personal development (for promotion)	2 (1.3)	69 (47.9)	47 (13.9)	20 (13.9)	6 (4.2)	2.72
More individually for engineers’ job rating and awarded	13 (9.0)	19 (13.2)	52 (36.1)	28 (19.4)	32 (22.2)	3.33

Note: the parenthesized values indicate percentage.

A strong interdependence between the companies’ QMS development motivations and the results obtained exists. When firms simply react to external pressures for getting highest quality of product and services certified, they may treat ISO 9000 certification as a prime goal in itself, adopt a minimalist approach to achieve it and thus achieve limited internal performance improvements. For small auto component-supplier companies, certification is only a guarantee that the company is using a quality management system according to a list of requisites and procedures established by auto manufacturing company Uz Auto Motors. However, the benefits that have been attributed to ISO 9000-based QMS have often been overstated, so that companies tend to generate high expectations that are difficult to realize completely (86% of managers think so).

According to the international researches, the strongest, most obvious and most valued effects of the ISO 9000

standards were clearer and more apparent working procedures and responsibilities. That connected to rising clear duty connected with bureaucracy and wide paper-making activities, on opinion of front-line managers extra papers rate consist above 40% and more. Reason for that - the value of quality management systems, based on the 9001 standard, depends on the way they are implemented. The performance of quality management systems could improve, if companies would diligently adopt the new standard rather than attempt to incorporate it into the existing quality management systems [23].

The internal reasons of the companies motivated for developing QMS are:

1. obtain higher profits deriving from the improving of a quality system;
2. reach a greater practice of quality management development;
3. Progress of the total quality management.

Major of the companies' managers mentioned that the main reasons for QMS developing concerned firstly the internal and then the external business environment. From the overall findings of this study, we can concluded that strong internal motivation to improve a company's quality could help establish a quality management system that leads to external benefits as well as to internal benefits.

Although the main reasons and aims to developing a quality system are the improvement of the definition of the responsibilities and obligations of employees, a decrease in non-conformities, better communication, especially "down-up" among employees of different levels and increased efficiency.

On opinion top managers of companies (14% of all surveyed employees) that through a correct development of a quality management system a company was able to generate bottom-line savings and business performance enhancement. The main motives for seeking ISO 9000 certification were the improvement of the efficiency of quality systems and improvement in the efficiency of the quality management system.

E. Factor of Continuous Improvement Activity

The continuous improvement is very important for development of ISO 9000-based QMS of the developing period. The continuous improvement is actually the phase where the maintenance of the quality system is carried out and is important if an organization wants to continuously improve and reap the long term benefits of having a quality management system. Agnieszka Misztal investigated technical determinants of QMS success implemented in automotive industry [13].

Continuous improvement of processes, people and system are also very important factors for the sustainable quality management system. It is useful to apply other methods and tools to achieve the demanded quality as Suggestion system and Quality circle activity.

On employee's view point, suggestion making itself is important for achieving quality of the product and processes. The following figure indicates how they feel about their job and suggestions.

Table .3

	Strongly disagree	Disagree	Middle	Agree	Strongly agree	Mean
Importance of job	0 (0)	6 (4.2)	13 (9.0)	69 (47.9)	56 (38.9)	4.07
Importance of suggestions for company	5 (3.5)	19 (13.2)	43 (29.9)	53 (36.8)	23 (15.9)	3.30
Importance of suggestions for self-development of workers	3 (2.0)	9 (6.2)	34 (23.6)	28 (19.4)	70 (46.6)	4.06
Importance of training education for suggestion-making	8 (5.5)	13 (9.0)	31(21.5)	49(34.0)	43(29.8)	3.74
Importance of suggestion-making for qualityof product	11 (7.6)	14 (9.7)	18(12.5)	20(13.9)	81(56.2)	4.01



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Analyze of the impact of the continuous improvement approach to ISO 9000-based QMS benefits permits made out the some important conclusions. Firstly, organizations for develop and benefit the ISO 9000-based QMS must have a proactive approach driven by continuous improvement strategy. Secondly, organizations can effectively use QMS as a means of promoting and facilitating quality culture. The strongest positive feedback was found between a continuous improvement activity development and improved quality performance.

F. Factor of Quality Audit

Quality audits of all levels are powerful tools to increase the value of QMS. Focused value-added audit is not only source to produce data for the use in QMS developing, but also for decision-making on technology and staff development, product and processes, that based on current performance. The main reason for conducting audits is to obtain factual input for management decisions.

Quality audits divided into two types: external and internal audits. External Audits provided by Certification Organization (once in a year). Internal audits divided itself on QMS audit (holds deeply; weekly audits); Quality Department audit (weekly); Production Director Audit (2 times in a month), CEO (Chief Executive Officer) Audit (once in month).

The generally department-based audits invariably provide data for making fast managerial decisions concerned with problems of the technology, product and processes and staff development, because these decisions are based on current performance. There are a number of approaches generally used in conducting internal and external quality system audits, and not all of them are successful.

The processes-based auditing is more effective but in Uzbek SME processes approaches till now is not developed enough.

Companies with ISO 9000 standards-based QMS want auditors not only to issue ISO certificate, but also to share their own experience and give suggestions for improvement. For example, "Uz Auto Motors" SC as original equipment manufacturers (OEMs) require auditors of BIQS (Built in Quality Supply, corporate standard of quality) and IATF (International Automotive Task Force) -16949 for suppliers to identify opportunities for improvement in their quality activity. [6]

G. Factor of corporate culture

As above indicated QMS is social-technical system, the main part of QMS is people – employees, managers, engineers heads and customers, officials and others. So, capabilities of employees and their supervisors, their approaches to job, their mutual communication are very important on maintenance and development of the QMS.

It means the culture of people in society and company is basic for the behavior and approaches to work. In words of Henry Ford, well known as famous businessman, engineer and manager – "quality is made out own job good when nobody see"[3],[4].

Culture of company and jobs consist of: technological and executive discipline, educational and professional levels of employees, level of production technologies and level of wages. Also there are 3 kinds of company culture:

1. culture of material things (as physical environment of production site – ergonomics and visualization, clearness on job place, arrangement of tools, right maintenance of equipment and etc.),
2. employees culture (their professionalism, approach to job, personal capabilities and level of one's utilization, local traditions and habits and etc.),
3. management culture (attitude to employees, managerial behavior, style of management and leadership and etc.) [10].

Results of our surveys shown that culture of material things may be easily modified by study and implementing a world-class experience of the foreign partners. Employees' culture and especially management culture cannot modify so easily, because they based on national mental culture, except outer signs of behavior.

Because culture of quality is all methods using personnel in their job in company, one's achieved through

developing of all kinds company’s cultures and it is source of significant and fast improving of quality without a large financial expanses. Also, rising of company’s culture is a key factor as a long-term success factor of improvement QMS.

II. CONCLUSION

The result of this study shows the understanding of the ISO 9000-based QMS itself as social-technical system. Main components of this system that provided sustainable development are Quality Policy and Strategy, Quality-focused Production Management, Continuous Improvements and Innovations for Quality based on Paradigm change (Personnel development, Empowerment, Reward and Motivation system, Team work and effective communication are key success factors for ISO 9000 – based QMS maintenance and development. Managers of organizations should carefully design the QMS on the ISO 9000 principles and development strategy. It is important to realize the necessity to align QMS development programs with general business strategies to ensure that efforts reflect the long-term goals of an organization.

A strong interdependence between the above mentioned key success factors and the results obtained exists. ISO 9000-based QMS must uses as a company’ general development tool, while market pressure is also one of the main motivation factors.

Continuous improvement is very important factor during the post-certification period of the quality system and ones is important if an organization wants to continuously improve and reap the long term benefits of having a high developed quality management system. Continuous improvement of processes, people and system, the reward system, team work, the measurement of performance and communication are all key success factors for the sustainable quality management system.

The structure of the identified factors for shaping Quality Policy, QMS development strategy and QMS sustainable development shown on the fig.2.

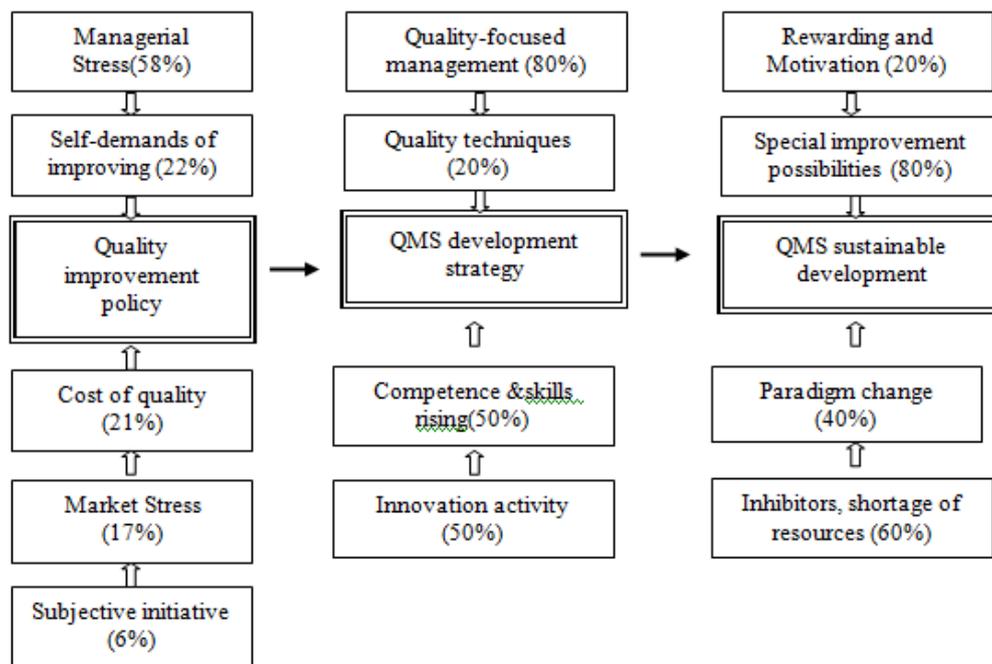


Fig.2. The Structure of factors of QMS sustainable development.



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Thus, based on results of this study and more detail we can say - for QMS very important :

1. messages regarding who is invited to quality improving activity participate must be clear (in principle – all employees);
2. education and training are very important in the first stage of QMS development;
3. rewarding procedure must be suitable and clear for all employees;
4. quality management system needs in continuous support for system.

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Interested areas: Quality Management System, Quality Assurance, Implementation of the International Standards on QMS, Engineering tools of Quality Systems, FMEA – (Failure Mode and Effects Analysis) and etc.